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## REMARKS/ARGUMENTS

Claims 16-32 remain pending in the application, all rejected. Claim 18 has been amended to correct a typographical error affecting the dependency of the claim. Claim 28 has also been amended to more distinctly point out the subject matter of that claim.

Although the previous art rejections have been withdrawn, the claims now stand rejected over U.S. Patent No. 6,282,455 to Engdahl, which issued August 28, 2001, more than two years prior to the first office action, mailed September 29, 2003, and responded to by Applicant.

### I. GENERAL OVERVIEW

#### A. The Present Invention

As discussed in the Response of August 20, 2004, incorporated herein by reference, the present invention involves the separation of device functionality and technological functionality, allowing users to control technological functions without regard for the underlying functionality of the controlling devices. One aspect, among others, through which the inventors have embodied and applied their insight is the technology object.

An approach according to the present invention permits the advantage of a technology-neutral base system for basic control functions, with technological functionality of the control provided by technology object types that can be selectively loaded, dependent upon the application, to supplement the basic functionality of the controller.

A relevant characteristic of technology objects, therefore, is that they embody technological functions for use in industrial control that preferably represent real world components. (App. at para. 10). Further, technology objects are instances of technology object types. As implemented in the preferred embodiment, technology object types provide technological functionality that is added to a controller. Additionally, technology objects usually relate to real world component types such as cams, external sensors, probes, etc. (App. at para. 54). Further, technology object types may be added to controllers in groups ("technology packages") that represent related technological functionality.

A technology object is a specific instance of a technology object type. Instantiated technology objects are configured and parameterized to represent a specific technological

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function. (App. at paras. 35-39 and Fig. 3). Preferably, the technological function embodied in the technology object represents a real world component or subcomponent, although a technology object can represent a virtual component. The technology objects implemented in one embodiment comprise a technology object type designator, name (TO identifier), configuration data, system data, commands, and alarms. The configuration data sets the basic mode of functionality of a technology object to correspond to the specific functionality of a component and the TO identifier provides a name to uniquely identify that component.

## B. The Engdahl Reference

The primary reference now resorted to, U.S. Patent No. 6,282,455 to Engdahl et al. (Engdahl), is vastly different from the claimed invention and does not disclose or suggest any of its limitations. Engdahl does not disclose or even suggest the combination of control means that are independent of the controlled components, with component control means relating to the controlled components that are for supplementing the control means, and in which the component control means are implemented using a plurality of technology objects corresponding to the components, and the technology objects distributable on the devices.

Far from doing so, Engdahl merely describes a *user interface* that includes a representation of a control system. Engdahl thus does not describe any component control means, since the user interface representations it describes:

- i. do not play a role in actually controlling anything;
- ii. do not supplement any control means;
- iii. do not include technology objects; and
- iv. do not include technology objects that are distributable on the plurality of devices implementing the industrial controller.

Therefore, as described below with respect to the claims, the rejection of the pending claims is without merit.

## II. REJECTIONS UNDER 35 U.S.C. § 102(e)

Although the Office Action at item 7, page 3, states that only claims 16-19, 21-23 and 25-26, 30 and 32 stand rejected under 35 U.S.C. § 102(e), the succeeding pages through the end of

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page 7 detail purported rejections of all pending claims, as also has been indicated on the Office Action Summary, PTOL-326. Applicant will address, and traverse, each rejection in turn.

A rejection of a patent claim as anticipated requires a showing that every limitation of the claim, as properly construed, be identically disclosed in the applied reference.

In brief, the rejections appear to be based on the contention that Engdahl discloses (software) objects used for component control means supplementing a control means of an industrial controller. This contention is erroneous: Engdahl merely discloses a user interface and the objects referred to in the rejection have to do with representing physical objects in a factory setting that are represented in the user interface, but are not capable of being invoked for use by an industrial controller.

From Applicant's claims and specification, it is clear that the word "object" and the term "technology objects" refer to software objects that are used by the industrial controller to effect control. This plain meaning cannot be overlooked in rejecting the claims.

Because Engdahl fails to disclose every limitation of the pending claims, as properly construed, the rejections are without merit and should be withdrawn.

### Claim 16

Among other things, Engdahl fails to disclose or even suggest component control means relating to the controlled components for supplementing the control means.

The rejection relies on the supposition that this limitation is shown by Engdahl at column 5, lines 52-59. That passage states, in pertinent part:

The virtual environment represented by nodes 84 and 83 may serve as an organizational structure for the large amount of information relevant to the control system 10 represented as objects 64. Each object 64 is represented by one node in the scene graph 56, for example, a manipulator on the factory floor may be represented by a node 64.

Neither this passage, nor any other in Engdahl, describes "component control means." As the quoted passage states, it merely discloses a virtual environment that may serve as an organization structure – that is, a mere representation – consistent with the goal of Engdahl of providing a "human/machine interface for designing, monitoring and troubleshooting complex

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industrial systems.” (Engdahl, Abstract). A representation on a human machine interface is not a control means.

Engdahl also does not disclose or suggest component control means implemented using a plurality of technology objects corresponding to the components. Claim language such as “objects” and “technology objects,” as recited in the pending claims, must be construed in the context of the claims, the specification and the art. The word “object,” as recited in the pending claims, refers to a software construct utilized in a controller – as is clear from the claims as a whole and as is amply described in the pending application at para. 0010, pp. 2-3 and elsewhere.

The word “object” in the passage from Engdahl relied on in the rejection is not a software object used in a controller, but is a representation for purposes of Engdahl’s human machine interface, by nodes in a scene graph.

Engdahl also, therefore, does not disclose or suggest “technology objects,” as recited in the claims and described in the application. Nor does Engdahl disclose or suggest that the technology objects, or any objects, making up component control means for supplementing the control means.

Finally, Engdahl does not disclose that such (technology) objects are distributable on a plurality of devices making up the industrial controller.

For these reasons, Engdahl fails to disclose or even suggest the invention as recited in claim 16. Claim 16, and claims 17-26, which depend from it, are therefore respectfully submitted to recite allowable subject matter.

**Claim 17**

Claim 17 depends from claim 16 and further recites communication links between at least two of the technology objects that are automatically generated.

As discussed above, Engdahl does not disclose or suggest technology objects, much less a basis for component control means supplementing a control means of the claimed industrial controller.

The rejection relies on Figure 2 as showing the recited invention. Figure 2, though, actually shows “a fragmentary...view of a factory showing the control system...and its associated machinery as located within the factory.” Again, the rejection appears to be based not

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only on a misapplication of Engdahl, but also on an incorrect construction of “technology objects” as representing physical objects, such as are on a factory floor, and not for use by an industrial controller in controlling an industrial process, as is plainly understood from the pending claims and the specification.

Claim 17 is, for this additional reason, therefore submitted be allowable.

### **Claim 18**

Claim 18, now amended, depends from claim 17 and further recites that technology objects comprise attributes take into account in the generation of the communication links.

The passage from Engdahl (column 6, lines 1-9) does not relate to technology objects, as properly construed. Moreover, it states that properties of objects are provided by nodes, which differ from the objects themselves comprising attributes, and which attributes are taken into account in the generation of the communication links.

Claim 18 is therefore submitted, for this additional reason, to be allowable.

### **Claim 19**

Claim 19 recites that technology objects are distributable on a plurality of devices within a project, the project relating to a plurality of control units.

Figure 2 of Engdahl is asserted to show this limitation. But, as described above, Figure 2 shows a factory floor, not technology objects, as properly construed, nor technology objects that are “distributable on a plurality of devices within a project, the project relating to a plurality of control units,” as recited.

For these reasons, claim 19 is submitted to be allowable for this additional reason.

### **Claim 20**

Claim 20 depends from claim 16 and further recites that the functionality of the technology objects is distributed among control units in equidistant communication with one another in real time with clock synchronization.

The rejection contends that this is shown by Engdahl at column 7, lines 3-7. This passage, however, states that “[a] watch tool 70 is used for measuring real-time occurrences in

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the factory environment as reflected in its virtual depiction or for modifying the relationship between virtual time and real time in instances where troubleshooting and simulation of the factory may be desired." In addition to failing to disclose anything relating to technology objects, on its face this passage discloses nothing about distribution in equidistant communication with one another with clock synchronization, as claimed.

For this additional reason, claim 20 is allowable.

**Claim 21**

Claim 21 depends from claim 16 and recites that technology object types permit technological scaling of the functionality of the controller.

This limitation is said to be shown by Engdahl at column 5, lines 60-65. That passage refers to node 64 providing a 3-D depiction of a manipulator "through a number of children 'machine element' nodes" and which may be animated in response to certain variables.

This passage, on its face, is entirely inapposite and has apparently nothing to do with technological scaling using technology object types.

Claim 21 is, for this additional reason, submitted to be allowable.

**Claim 22**

Claim 22 depends from claim 16 and further recites that technology objects are interleaved to form container objects.

This is said to be shown by Engdahl column 2, lines 17-20, which states: "These spatial 'objects' may also serve as 'containers' allowing certain objects to be placed within other objects in nested configuration providing yet another dimension of organization." However, as described above, Engdahl does not disclose or suggest technology objects, as properly construed.

Claim 22 therefore recites allowable subject matter.

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**Claim 23**

Claim 23 depends from claim 16 and further recites that the industrial controller is adapted to provide a plurality of views of the technology objects to a user.

As described above, Engdahl does not disclose technology objects, as that term is properly construed and, therefore, does not disclose the additional limitation that the industrial controller is adapted to provide a plurality of views of the technology objects.

For this additional reason, claim 23 is submitted to recite allowable subject matter.

### Claim 24

Claim 24 depends from claim 16 and recites that the industrial controller is adapted for feedback-free programming of a technology object with respect to the other technology objects and the control means. This claim limitation is said to be identically disclosed by Engdahl's Figure 2. But the rejection fails to explain how this is so. As discussed above, nowhere does Engdahl disclose a "technology object." Neither Figure 2, moreover, nor the accompanying text discloses or suggests "feedback-free programming of a technology object with respect to the other technology objects and the control means."

For this additional reason, claim 24 is submitted to be allowable.

### Claim 25

Claim 25 depends from claim 16 and recites that technology objects are represented in the engineering system by graphical elements. Again, Engdahl does not disclose technology objects, as properly construed. Claim 25 is therefore submitted to be allowable.

### Claim 26

Claim 26 depends from claim 16 and further recite that technology objects have types and the technology object types are clustered into one or more technology packages.

The rejection contends that the recited invention is shown by Engdahl at column 2, lines 50-58. That text states that "the images displayed may include an image of the data and the computer may further execute the interface program to animate the images in response to signals on the electrical network to depict operation of the industrial process...." This text on its face

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does not disclose "technology objects," as properly construed, nor does it have anything to do with clustering such technology objects.

For this separate reason, claim 26 is submitted to be allowable.

### Claim 27

Claim 27 is an independent claim to a method of programming an industrial control system having a plurality of devices and programmed for one or more projects and having a plurality of technology objects. The claim calls for: providing a technology-neutral control system; interleaving of the technology objects to form a set of complex technology objects; distributing a plurality of the technology objects on a plurality of the devices; and reusing at least one of the complex technology objects in a second project.

As has been discussed above, Engdahl does not disclose technology objects, interleaving of those objects or distributing a plurality of technology objects on a plurality of the devices. For these reasons alone, Engdahl fails to make out a case of unpatentability of claim 27. Moreover, Engdahl does not disclose or suggest reusing at least one of the complex technology objects in a second project. This limitation is said to be shown at column 7, lines 30-33 of Engdahl. That passage, however, does not disclose or suggest “technology objects,” as properly construed, nor does it disclose reuse in a second project of the ones for which the controller is programmed.

For these reasons, claim 27 recites allowable subject matter.

**Claim 28**

Claim 28, now amended, depends from claim 27 and further recites that attributes of the technology object are taken into account in generating the communication channels. For reasons analogous to those raised in traversing the rejection of claim 18, claim 28 is submitted to recite allowable subject matter.

### Claim 29

Claim 29 is an independent claim reciting limitations that overlap, in pertinent part, with those of claim 28, the allowability of which is argued above. For analogous reasons, claim 29 is submitted to be allowable over Engdahl.

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**Claim 30**

Claim 30 is also an independent claim directed to a method for programming an industrial controller. It recites the steps of selecting a plurality of technology objects, interleaving the selected technology objects to form technology objects having complex functionality, and distributing the interleaved technology objects onto a device.

For reasons discussed at length above, Engdahl does not disclose or suggest technology objects, as properly construed, interleaving of such objects to form technology objects having complex functionality, or distributing the interleaved technology objects onto a device.

Claim 30 is therefore submitted to be recite allowable subject matter.

**Claim 31**

Claim 31 depends from claim 30, and further recites that interleaved technology objects may be re-used in a subsequent application of the method. Again, for reasons provided above, Engdahl does not disclose the limitations of claim 31, which allowable subject matter.

**Claim 32**

Claim 32 is an independent claim reciting a system for programming an industrial controller. It recites an industrial control system, means for selecting a plurality of technology object relevant to a desired application, means for interleaving the selected technology objects having complex functionality, and means for distributing the interleaved technology objects onto a plurality of devices.

As described above, Engdahl does not disclose "technology objects," as properly construed, nor, therefore, the recited means for selecting a plurality of such technology objects relevant to a desired application. Engdahl, also as discussed above, fails to disclose "means for interleaving" the selected technology objects having complex functionality. Finally, Engdahl does not disclose the recited means for distributing the interleaved technology objects onto a plurality of devices. This last limitation is said to be shown by text at Engdahl's column 5, lines 60-67, providing a "three dimensional depiction of a manipulator through a number of children 'machine element nodes' [and which] may be animated...." This passage, however, neither

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discloses nor suggests the recited means for distributing interleaved technology objects (which are for use in effectuating industrial control) onto a plurality of devices.”

Claim 32 therefore is submitted to recite allowable subject matter.

### III. CONCLUSION

Claims 16-32 are pending in the application, claims 18 and 28 having been amended. Applicant submits that the claims, for the reasons set forth above, recite patentable subject matter and are now in condition for allowance. Reconsideration and allowance are therefore respectfully requested.

Other than as specified in the first paragraph of this communication, no fee is believed to be due in connection with this communication. However, if such additional fee is required, the Commissioner is authorized to charge the fee to Deposit Account No. 23-1703.

Dated: 2/14/05

Respectfully submitted,

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